

A new species of *Lecanodiaspis* Targioni Tozzetti, 1869 (Hemiptera, Coccoidea, Lecanodiaspididae), with an updated checklist of the false pit scales of China

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Abstract

A new species of false pit scale (Hemiptera, Coccoidea, Lecanodiaspididae), *Lecanodiaspis jiangxiensis* Zhang & Wang, **sp. nov.**, collected on *Castanea mollissima* Blume (Fagaceae) in Jiangxi, south China, is described and illustrated based on the morphology of the adult female. A taxonomic key and an updated checklist of false pit scales known from China are provided.

Key words: Distribution, Fagaceae, host, key, *Lecanodiaspis jiangxiensis*



Academic editor: Takumasa Kondo

Received: 4 February 2025

Accepted: 21 March 2025

Published: 6 June 2025

ZooBank: <https://zoobank.org/71BCEBF5-991C-47F5-9568-006E14DEF41F>

Citation: Zhang J, Wang K, Watson GW, Liu X, Wang X (2025) A new species of *Lecanodiaspis* Targioni Tozzetti, 1869 (Hemiptera, Coccoidea, Lecanodiaspididae), with an updated checklist of the false pit scales of China. ZooKeys 1240: 219–238. <https://doi.org/10.3897/zookeys.1240.148728>

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Introduction

The scale insects (Hemiptera: Sternorrhyncha: Coccoidea) are small, sap-sucking true bugs (Hodgson and Hardy 2013), with more than 8500 described species across 35 extant and 20 extinct families (García Morales et al. 2016). The family Lecanodiaspididae (Hemiptera: Coccoidea) was established by Borchsenius (1959), with *Lecanodiaspis* Targioni Tozzetti as the type genus. This genus was initially placed in the family Asterolecaniidae but was elevated to family rank by Borchsenius (1959), primarily due to the presence of an anal cleft. Currently, Lecanodiaspididae is composed of 83 species in 12 genera (García Morales et al. 2016), although the validity of some genera remains in doubt (Wang et al. 2024).

The Lecanodiaspididae, also known as false pit scales, are widespread across all zoogeographical regions, with the highest diversity in the Oriental and Australasian regions (Wang et al. 2024). According to ScaleNet (García Morales et al. 2016), an open-source database for scale insects, China has 16 species of false pit scales in five genera: *Cosmococcus* Borchsenius, 1959 (one species); *Crescoccus* Wang, 1982 (one species, considered a synonym of *Pseudopulvinaria* Atkinson, 1889 (family Coccidae) by Tang and Hao 1995);

Lecanodiaspis Targioni Tozzetti, 1869 (six species); *Prosopophora* Douglas, 1892 (five species, considered a synonym of *Lecanodiaspis* by Cockerell 1896, Howell and Kosztarab 1972); and *Psoraleococcus* Borchsenius, 1959 (three species). However, through the examination of specimens and a review of the literature, four additional species have been recorded or found in China: (i) *Anomalococcus crematogastri* Green, 1902, reported from Taiwan by Lambdin and Kosztarab (1973); (ii) *Psoraleococcus lombokanus* Lambdin & Kosztarab, 1973, reported from Fujian and Sichuan by Tang and Hao (1995); (iii) *Lecanodiaspis quercus* Cockerell, 1896, was collected from Yunnan; and (iv) *Psoraleococcus multipori* (Morrison, 1921) was collected from Hainan. On the other hand, *Crescoccus candidus* Wang, 1982 was not included in this study, and *Lecanodiaspis majestica* Wang & Qiu, 1986 was treated as a junior synonym of *L. quercus*; detailed explanations for both these cases are provided in the Discussion below. This brings the total number of false pit scale species recorded in China to 18.

In the present study, a new species of *Lecanodiaspis*, *L. jiangxiensis* Zhang & Wang, sp. nov., collected on *Castanea mollissima* Blume (Fagaceae) in Jiangxi, south China, is described and illustrated based on adult female morphology, increasing the total number of recorded species to 19. We provide an updated checklist of false pit scales known from China, with information on their hosts and distributions and a taxonomic key to the species.

Materials and methods

The specimens examined in this study are deposited in the College of Forestry, Jiangxi Agricultural University, Nanchang, China (**CFJAU**), and the Insect Collection of the Southwest Forestry University, Yunnan, China (**SWFU**). In the ‘Type material’ section, holotype data is provided with “/” used to separate each line of information on the slide label, which is written in Chinese.

Freshly collected specimens were carefully placed in tubes containing 75% or 100% ethyl alcohol and transported to the laboratory. The cuticles of the specimens were stained and mounted on microscope slides using the method described by Borchsenius (1950). The morphological terminology used follows Howell (1971) and Lambdin and Kosztarab (1973). The taxonomic illustration of *L. jiangxiensis* includes a central enlargement of the entire body, with the dorsum shown on the left side and the venter on the right, along with vignettes of important structures (not drawn to scale) around the margin. The body measurements are provided in millimeters (mm), while those for other structures are given in microns (µm). In the checklist, genera and species are listed alphabetically, accompanied by relevant references, host plant records, and collecting sites in China.

Results

Taxonomy

Genus *Lecanodiaspis* Targioni Tozzetti, 1869

Type species. *Lecanodiaspis sardoa* Targioni Tozzetti, 1869 by monotypy.

Generic diagnosis. (adapted and modified from Hodgson 1973; Kosztarab and Kozár 1988; Williams and Watson 1990). Adult female test waxy or papery,

enclosing adult and eggs. Adult female subcircular or elliptical. Antennae each normally 7–9-segmented. Legs absent or each 1–5-segmented, without tibio-tarsal sclerosis. Thoracic spiracles each associated with primarily quinquelocular pores that extend into spiracular furrow, terminating at enlarged spiracular setae on body margin; usually with two spiracular setae opposite each anterior spiracle; also with a single spiracular seta present opposite each posterior spiracle, except when posterior spiracular furrow divided, then end of each furrow with a single spiracular seta. Dorsum with cribriform plates normally present in two (rarely four) longitudinal rows. Anal ring bearing 8–10 setae and two or three rows of cone- or nipple-shaped pores; with an arched plate above anal ring. Anal plates each usually triangular, ridged and with two stout setae dorsally, plates normally connected at mid-line. Anal cleft short; anal lobes each with single long apical seta and associated short setae. Dorsum with various disc pores, 8-shaped pores, tubular ducts and setae present. Ventral margin with a line of large 8-shaped pores similar to dorsal pores, a submarginal line of smaller 8-shaped pores, and a sparse band of minute bilocular pores reaching as far medially as an imaginary line formed by antennal bases, coxae and anal plates medially to the 8-shaped pores. Minute simple pores and tubular ducts present throughout ventral surface; multilocular disc pores present around genital opening and more anteriorly; quinquelocular pores present in spiracular furrows, sometimes reduced to small groups near spiracles. Labium 1-segmented, with short terminal setae.

***Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov.**

<https://zoobank.org/3ECD91AD-EBAB-402A-98D2-AE3FE3D8A1CD>

Figs 1–5

Type material. Holotype: • Adult ♀ (mounted singly on a slide, CFJAU), CHINA: Jiangxi Province, Yichun City, Fengxin County / Zaoxia Town, Niyang Village / (28°49'16"N, 115°5'40"E) / on branches of *Castanea mollissima* (Fagaceae) / 13.vii.2022, coll. Jiangtao Zhang. **Paratypes:** • 13 ♀♀ (including two specimens split into dorsal and ventral surfaces and one damaged specimen lacking anal ring, mounted singly on 13 slides, CFJAU), same data as holotype; • 2 ♀♀ (mounted singly on two slides, SWFU), same data as holotype.

Description. Appearance of adult female in life (Fig. 1). Rounded to oval, slightly to strongly convex (becoming more convex with age), yellow to brownish-yellow. With a longitudinal medial carina between 8–10 short conical projections, and ~ three longitudinal lateral carinae on each side.

Male test. Not seen.

Slide-mounted adult female (Fig. 2) ($n = 8$): Body oval to subcircular, 4.05–4.95 mm long and 3.75–4.70 mm wide.

Dorsal surface. 8-shaped pores (Fig. 2X, V): Numerous, each pore bent, distributed throughout derm, of two sizes. Larger pores (Fig. 2X), each 5–6 µm long, present in a marginal band ~ 2–4 wide, also in irregular clusters on dorsum. Smaller pores (Fig. 2V), each 3.5–4.5 µm long, irregularly spaced throughout remainder of derm. Trilocular pores (Fig. 2W) occasionally present.

Simple disc pores (Fig. 2T): Numerous, evenly distributed, each 2–3 µm in diameter.



Figure 1. Adult females of *Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov. on branches of *Castanea mollissima* (Fagaceae).

Tubular ducts (Fig. 2Q): Numerous, evenly distributed, cylindrical, each 27–36 μm long and 3.5–4.0 μm wide.

Setae: Marginal setae (Fig. 2S) stiff, spine-like and pointed apically, each with a stout basal socket, 12.5–20.0 μm long. Other short setae rare dorsally, but not shown on Fig. 2.

Spiracular setae (Figs 2U, R, 3A, B): Two anterior spiracular setae (Figs 2U, 3A), subequal in size, 67.5–85.0 μm long and 7.5–10.0 μm wide, both appearing somewhat concave and bladelike at apex. Two posterior spiracular setae present singly, with one at each outer end of bifid posterior spiracular furrow (Figs 2R, 3B), each seta approximately same length as an anterior spiracular seta.

Cribriform plates: Arranged in two longitudinal rows with four plates in each row. Each plate (Figs 2P, 4) 67.5–75.0 μm in diameter and bearing 15–32 small conical-like setae, sometimes with two or three small conical setae fused together.

Anal ring (Fig. 2O): Elliptical, slightly open at posterior end, 60–75 μm in diameter; bearing 10 long setae (12 setae on one specimen), each seta 142–187 μm long, and with three concentric rows of nipple-like projections.

Anal plates (Fig. 2O): Narrowly connected at mid-line. Each plate triangular, 150–172 μm long and 125–245 μm wide, wrinkled dorsally and with 3–5 pores; also bearing two fairly stout setae (occasionally with two on one side and three on the other) situated dorsolaterally on posterior half of plate, each seta 20–25 μm long; and with one slender seta on inner margin, 17.5–32.5 μm long, and two short, slender setae at junction of anal lobes, 17.5–20.0 μm long.

Arched plate (Fig. 2O): Crescent-shaped, 125–150 μm long.

Anal cleft: Distinct, 175–300 μm long.

Anal lobes: Each lobe slightly rounded, terminating with an approximately apical seta, 75–100 μm long, and 9–14 shorter associated setae, each 15.0–37.5 μm long.

Ventral surface. Antennae (Fig. 2A): Well-developed, each usually 9-segmented (1 specimen with segment IV on one side apparently divided into 2

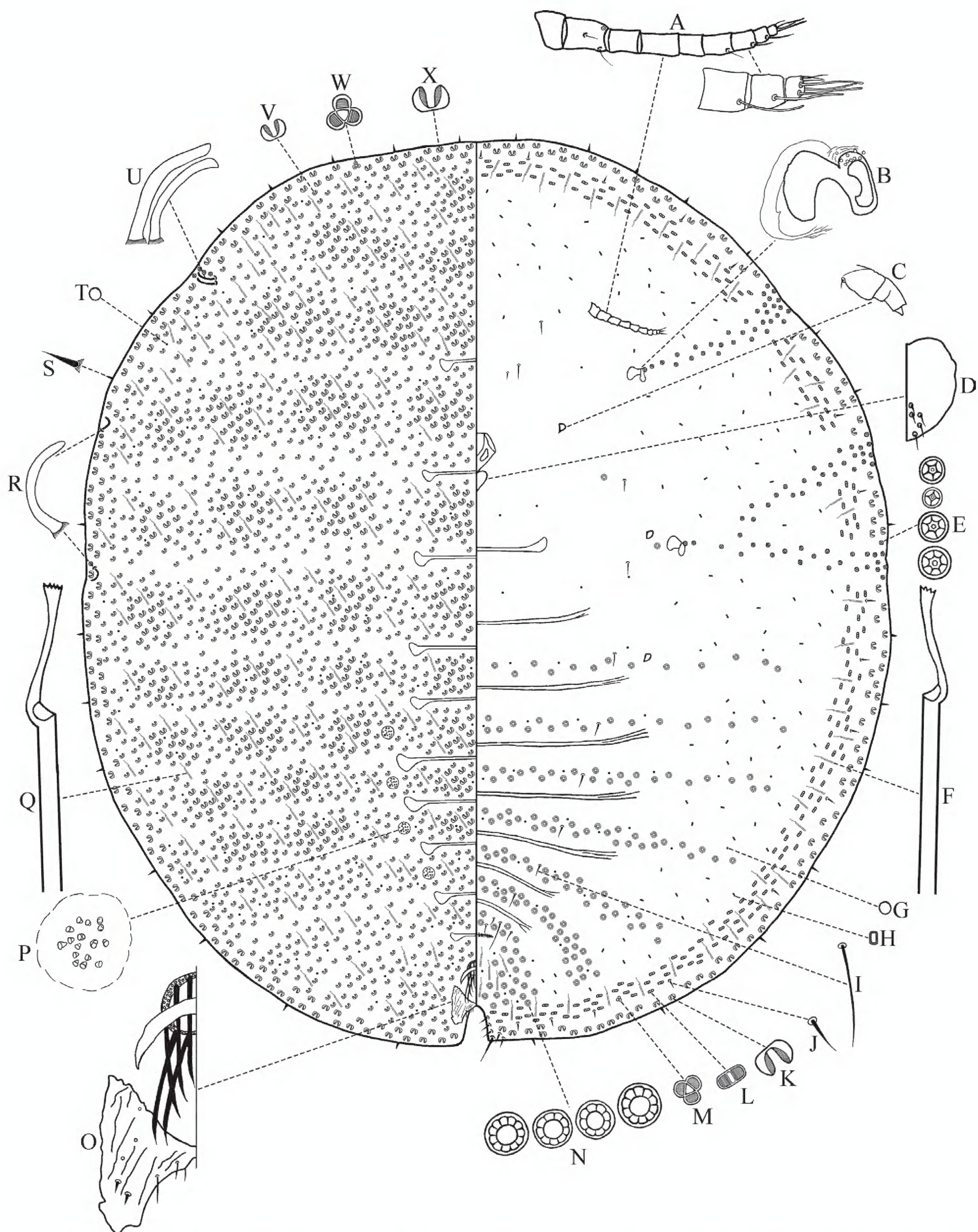


Figure 2. Adult female of *Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov. **A** antennae **B** spiracle **C** leg **D** labium **E** 5-, 4-, 6-, 7-locular pores **F** ventral tubular duct **G** ventral simple disc pore **H** bilocular pore **I** ventral submedian seta **J** ventral submarginal seta **K** ventral 8-shaped pore **L** ventral flat 8-shaped pore **M** ventral trilocular pore **N** 10-, 8-, 9-, 11-locular pores **O** anal ring, anal plates, arched plate **P** cribriform plate **Q** dorsal tubular duct **R** posterior spiracular seta **S** marginal seta **T** dorsal simple disc pore **U** anterior spiracular setae **V** dorsal small 8-shaped pore **W** dorsal trilocular pore **X** dorsal large 8-shaped pore.

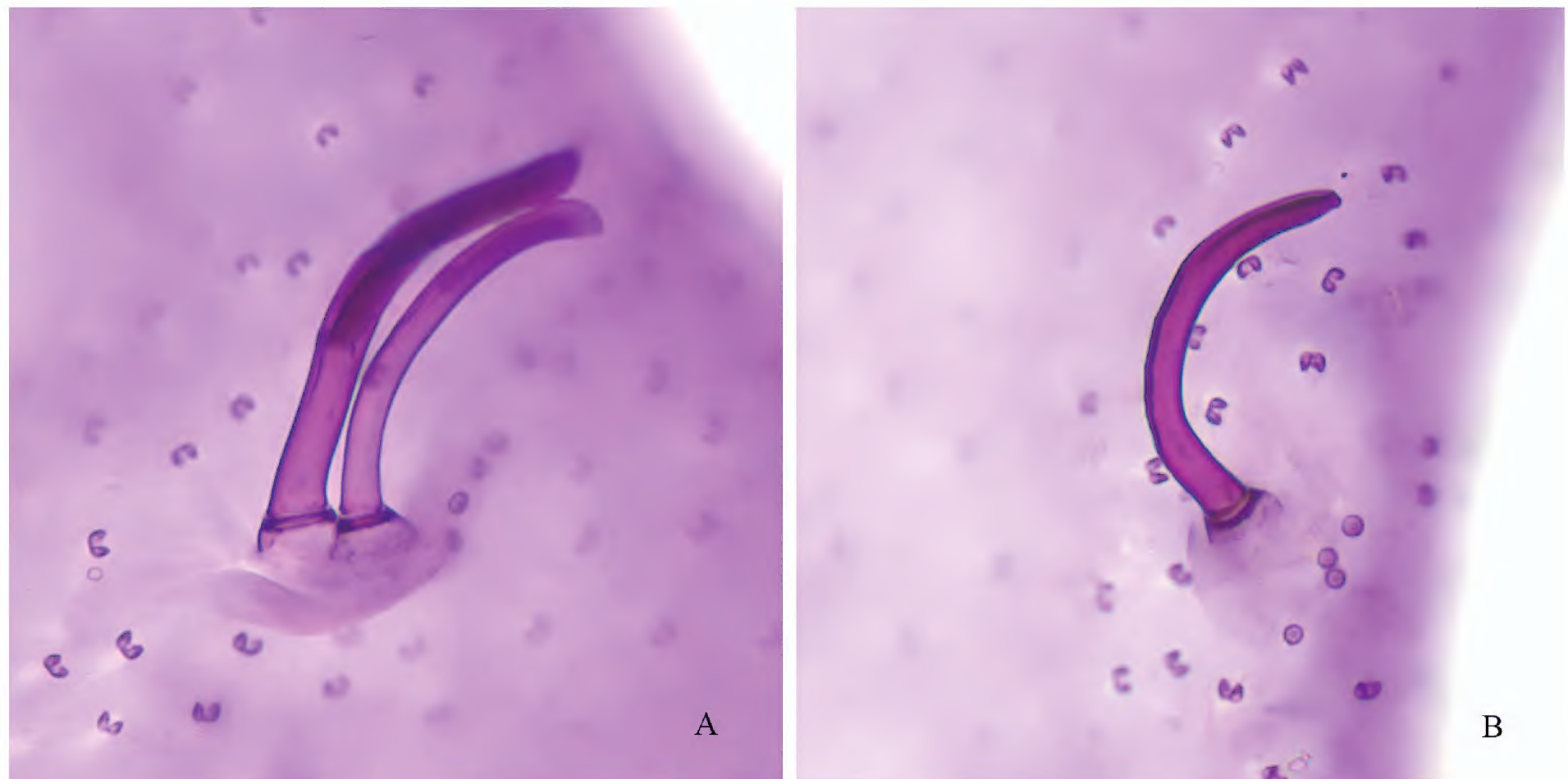


Figure 3. Spiracular setae of *Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov. **A** two anterior spiracular setae **B** a posterior spiracular seta.

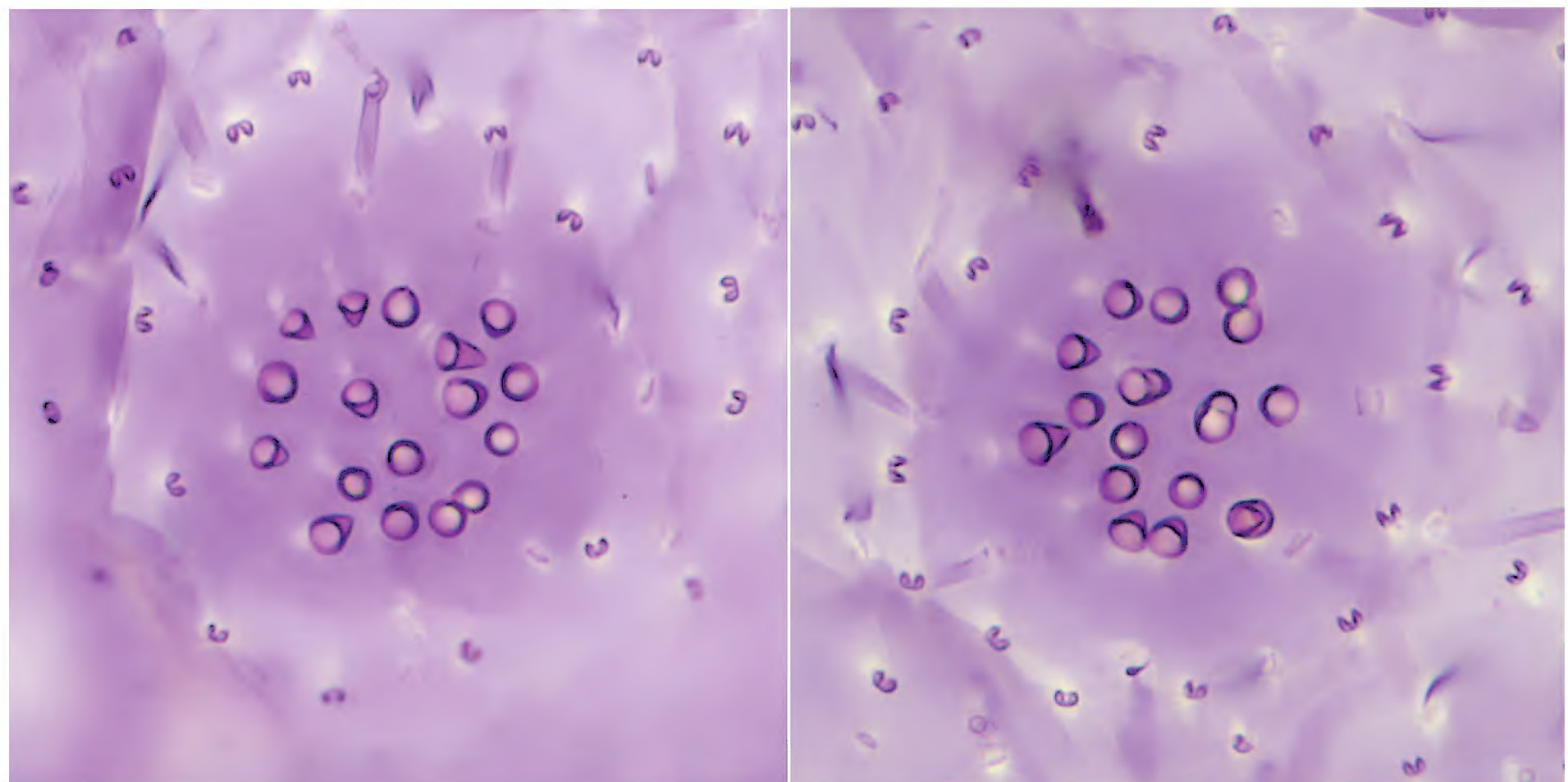


Figure 4. Dorsal cribriform plates of *Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov.

segments; and another specimen with only 1 complete antenna remaining, reduced to only 5 segments); 365–432 μm long; segment lengths (in μm): I, 42.5–56.5; II, 57.5–75.0; III, 57.5–65.0; IV, 50–65; V, 35.0–52.5; VI, 37.5–47.5; VII, 32.5–41.5; VIII, 22.5–27.5; IX, 13.5–22.5. Setae: segment I without or with one hairlike seta; segment II with one long hairlike seta, one shorter hairlike seta and a sensory pore; segments III, IV, and V each without setae; segment VI usually with one hairlike seta; segments VII and VIII each with a long fleshy seta; and terminal segment (IX) with three long fleshy setae and three or four short slender setae.

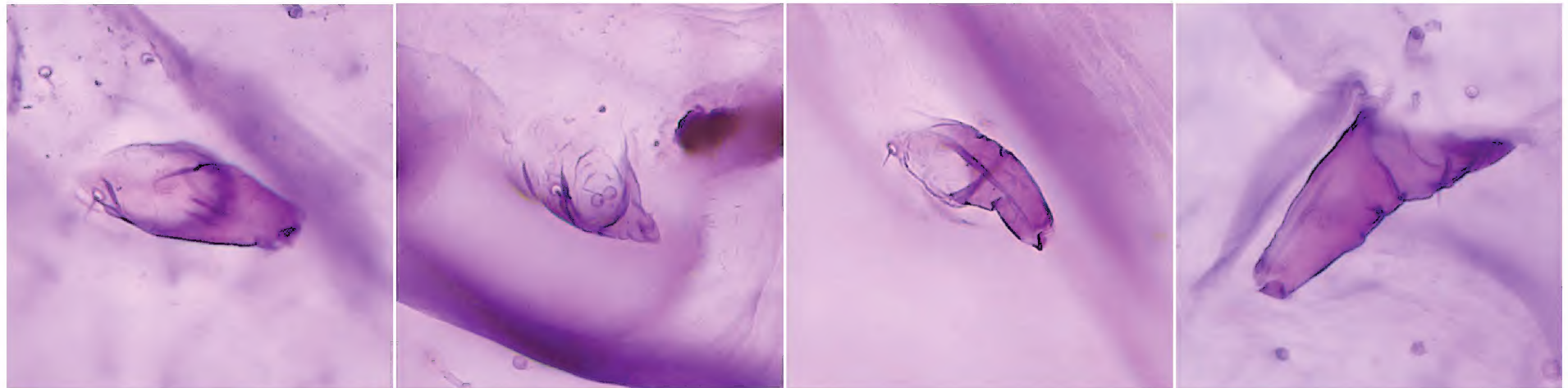


Figure 5. Legs of *Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov.

Clypeolabral shield: 202–220 μm long and 167–200 μm wide.

Labium (Fig. 2D): Triangular, 82.5–95.0 μm long and 95.0–122.5 μm wide, with five short setae on each side.

Legs (Figs 2C, 5): Reduced, fused and irregularly shaped (Fig. 5), 2–4-segmented, each leg 37.5–80.0 μm long; each leg usually with one short seta present at base, sometimes leg apices with claw remnants, occasionally tarsal digitules present (found only on 1 hind leg).

Spiracles (Fig. 2B): Anterior spiracles each 82.5–100.0 μm long and 70.0–92.5 μm wide; posterior pair approximately same size. Each anterior spiracle with 3–14 quinquelocular pores in heavily sclerotized area above peritreme; each posterior spiracle with 5–12 quinquelocular pores in similar position. Spiracular furrows containing primarily quinquelocular pores (Fig. 2E), each 3.5–4.5 μm in diameter, and a few 4-, 6- or 7-locular pores (Fig. 2E) spaced throughout furrows.

8-shaped pores (Fig. 2K, L): Two sizes of 8 shaped pores present on venter. Larger pores (Fig. 2K), each 5.5–6.5 μm long, bent, present in a narrow marginal band ~ 1–3 pores wide. Smaller, flat 8-shaped pores (Fig. 2L), each 4.5–5.0 μm long, forming a narrow submarginal band three or four pores wide just inside marginal pore band. Trilocular pores (Fig. 2M) occasionally present in this band.

Bilocular pores (Fig. 2H): Each 2.0–2.5 μm long, present in submarginal band, reaching posteriorly almost as far as anal lobes.

Simple disc pores (Fig. 2G): Each 2–3 μm in diameter, less numerous than those dorsally.

Multilocular disc pores (Fig. 2N): Primarily each with ten loculi (occasionally 8, 9, 11 loculi), each 6.5–8.0 μm in diameter, pores usually arranged in six transverse segmental bands across abdomen and one transverse band across cephalothorax; sometimes a few pores present also near mesothoracic leg and on prothorax.

Tubular ducts: Slightly narrower than those on dorsum (Fig. 2F), each 32.5–41.0 μm long and 3.0–3.5 μm wide, mainly present on margin. Smaller ducts present posterior to vulvar opening.

Setae: With 17–29 slender setae just anterior to vulvar opening, mostly each 7.5–17.5 μm long, but with one pair much longer, each 125–142 μm long. A pair of slender submedian setae (Fig. 2I), each 32.5–75.0 μm long, present on most abdominal segments, also extending to the head. Often with a more-or-less well-defined row of short, stout submarginal setae (Fig. 2J), each 10.0–12.5 μm long, associated with submarginal band of flat 8-shaped pores.

Microspines: Present on inner margins of anal lobes; smaller microspines numerous mid-ventrally on posterior half of abdomen, microspines not shown on Fig. 2.

Remarks. *Lecanodiaspis jiangxiensis* sp. nov. is similar to *L. pasaniae* (Borchsenius, 1960) in having the posterior spiracular furrow branched and in feeding on Fagaceae. However, *L. jiangxiensis* differs from *L. pasaniae* (character states for the latter given in parentheses) by having: (i) cribriform plates present in two longitudinal rows (absent); (ii) legs present, three pairs (absent, or only the prothoracic legs present); (iii) terminal antennal segment with three fleshy and three or four slender setae (with ~ three fleshy and six slender setae).

Etymology. The species epithet is formed from the name of the type locality, Jiangxi, combined with the Latin suffix “-ensis”, meaning “from”.

Key to species of the family Lecanodiaspididae known from China

Adapted and modified from Lambdin et al. 1973; Lambdin and Kosztarab 1973; Tang and Hao 1995.

- 1 Anal cleft at least twice as long as anal plate; body margin with prominent spiracular indentations 2
- Anal cleft less than twice length of anal plate; body margin without prominent spiracular indentations 5
- 2 Spiracular setae absent; multilocular disc pores limited to posterolateral clusters by vulva**Anomalococcus crematogastri Green**
- Spiracular setae present; multilocular disc pores forming transverse rows across abdomen, usually also on thorax 3
- 3 Dorsal cribriform plate groups extending into cephalothoracic region**Psoraleococcus multipori (Morrison)**
- Dorsal cribriform plate groups not extending into cephalothoracic region. 4
- 4 Lateral margin of each anal plate with 3 setae; labium with 8 setae**Psoraleococcus verrucosus Borchsenius**
- Lateral margin of each anal plate with 2 setae; labium with 10 setae**Psoraleococcus lombokanus Lambdin & Kosztarab**
- 5 Spiracular setae absent; each spiracle with ornate filiform sclerotizations, but without sclerosis overhanging peritreme**Cosmococcus erythrinae Borchsenius**
- Spiracular setae present; each spiracle without filiform sclerotizations, but sometimes with sclerosis overhanging peritreme 6
- 6 Anal plates distinctly reticulate on outer margins 7
- Anal plates not reticulate, but often with sclerotized ridges 16
- 7 Anal plates separate (not connected at mid-line), each plate with a notch on inner margin**Lecanodiaspis cremastogastri Takahashi**
- Anal plates connected at mid-line, each plate without a notch on inner margin 8
- 8 Anterior spiracular setae dissimilar, 1 fleshy and 1 spine-like**Lecanodiaspis foochowensis Takahashi**
- Both anterior spiracular setae fleshy 9
- 9 Body twice as long as wide, tapering at both ends**Lecanodiaspis elongata Ferris**
- Body less than twice as long as wide, elliptical 10

10	Anal ring with 10 setae	11
–	Anal ring with 8 setae.....	13
11	Ventral bilocular pores distributed throughout.....	
	 <i>Lecanodiaspis peni</i> (Borchsenius)	
–	Ventral bilocular pores restricted to submarginal and submedial areas.	12
12	Posterior spiracular seta longer than the smallest anterior spiracular seta	
	 <i>Lecanodiaspis costata</i> (Borchsenius)	
–	Posterior spiracular seta not longer than the smallest anterior spiracular seta.....	
	 <i>Lecanodiaspis simaoensis</i> Sun & Shi	
13	Cribriform plates in 2 longitudinal rows.....	14
–	Cribriform plates in 4 longitudinal rows.....	15
14	Dorsum with 3 sizes of 8-shaped pores; terminal antennal segment with 7 setae.....	
	 <i>Lecanodiaspis castanea</i> Sun & Zhang	
–	Dorsum with 2 sizes of 8-shaped pores; terminal antennal segment with 4 or 5 setae	
	 <i>Lecanodiaspis tingtunensis</i> (Borchsenius)	
15	Terminal antennal segment with 1 spine-like and 3 fleshy setae, the largest fleshy seta usually curved and with numerous forks.....	
	 <i>Lecanodiaspis quercus</i> Cockerell	
–	Terminal antennal segment with 3 slender and 4 fleshy setae, fleshy setae without forks.....	
	 <i>Lecanodiaspis lithocarp</i> Sun & Shi	
16	Posterior spiracular furrow not divided	17
–	Posterior spiracular furrow divided	18
17	Anterior spiracular setae unequal in size.....	
	 <i>Lecanodiaspis robiniae</i> (Borchsenius)	
–	Anterior spiracular setae equal in size.....	
	 <i>Lecanodiaspis circularis</i> (Borchsenius)	
18	Cribriform plates absent; legs absent, or only the prothoracic legs present.....	
	 <i>Lecanodiaspis pasaniae</i> (Borchsenius)	
–	Cribriform plates present, in 2 longitudinal rows; legs present, 3 pairs.....	
	 <i>Lecanodiaspis jiangxiensis</i> Zhang & Wang, sp. nov.	

Checklist of Lecanodiaspididae from China

Family Lecanodiaspididae Targioni Tozzetti, 1869

Type genus. *Lecanodiaspis* Targioni Tozzetti, 1869.

Genus *Anomalococcus* Green, 1902

Anomalococcus Green, 1902: 260. Type species: *Anomalococcus crematogastri* Green, 1902 by monotypy and original designation.

Anomalococcus crematogastri Green, 1902

Anomalococcus crematogastri Green, 1902: 261. Type data: Sri Lanka: Paradeniya, on *Ficus religiosa*. Syntypes, unknown, Type depository: London: The Natural History Museum, UK.

Host plant in China. Unidentified host (Lambdin and Kosztarab 1973).

Distribution in China. Taiwan (Kuraru [= Guizaijiao]) (Lambdin and Kosztarab 1973).

Genus *Cosmococcus* Borchsenius, 1959

Cosmococcus Borchsenius, 1959: 842. Type species: *Cosmococcus erythrinae* Borchsenius, 1959 by original designation.

***Cosmococcus erythrinae* Borchsenius, 1959**

Cosmococcus erythrinae Borchsenius, 1959: 845. Type data: China: Yunnan Province, Mangshi, on branches of *Erythrina indica*. Holotype, unknown, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Cosmococcus euphorbiae Borchsenius, 1959: 845. Type data: China: Yunnan Province, near Binchwan [= Binchuan], on the stems of *Euphorbia splendens*. Synonymized by Wang et al. 2024: 339.

Cosmococcus albizziae Borchsenius, 1960: 244. Type data: China: Yunnan Province, on branches of *Albizia mollis*. Synonymized by Wang et al. 2024: 333.

Material examined. CHINA: for details, see Wang et al. (2024).

Host plants in China. Apocynaceae: *Cascabela thevetia* (Wang et al. 2024); Euphorbiaceae: *Euphorbia milii* (Borchsenius 1959), *E. royleana* (Wang et al. 2024); Fabaceae: *Albizia mollis* (Borchsenius 1960), *Bauhinia purpurea*, *Dalbergia assamica*, *Erythrina crista-galli* (Wang et al. 2024), *Er. variegata* (Borchsenius 1959); Malvaceae: *Hibiscus rosa-sinensis* (Wang et al. 2024); Moraceae: *Ficus* sp., *F. altissima* (Wang et al. 2024), *F. benghalensis* (Lambdin and Kosztarab 1973); Myricaceae: *Myrica rubra* (Wang et al. 2024); Rosaceae: *Prunus* sp. (Wang et al. 2024); Sapindaceae: *Koelreuteria paniculata* (Wang et al. 2024).

Distribution in China. Yunnan (Baoshan, Dali, Dehong, Honghe, Kunming, Puer) (Wang et al. 2024).

Genus *Lecanodiaspis* Targioni Tozzetti, 1869

Lecanodiaspis Targioni Tozzetti, 1869: 261. Type species: *Lecanodiaspis sar-doa* Targioni Tozzetti, 1869 by monotypy.

Birchippia Green, 1900: 450–451. Type species: *Birchippia anomala* Green, 1900. Synonymized by Green 1901: 295.

Prosopophora Douglas, 1892: 207. Type species *Prosopophora dendrobii* Douglas, 1892. Synonymized by Cockerell 1896: 50.

***Lecanodiaspis castanea* Sun & Zhang, 1991**

Lecanodiaspis castanea Sun & Zhang, 1991: 342–343. Type data: China: Yunnan Province, Simao, on *Castanea mollissima*. Holotype, female, Type depository: Shandong: Insect Collections of the Department of Plant Protection, Shandong Agricultural University, China.

Host plant in China. Fagaceae: *Castanea mollissima* (Shi et al. 1991).

Distribution in China. Yunnan (Simao) (Shi et al. 1991).

***Lecanodiaspis circularis* (Borchsenius, 1960)**

Prosopophora circularis Borchsenius, 1960: 226. Type data: China: Yunnan Province, 25 km north of Tsindun [= Jingdong], on unknown host. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis circularis (Borchsenius, 1960): Howell and Kosztarab 1972: 159.

Prosopophora circularis Borchsenius, 1960: Kozár and Drozdják 1998: 418.

Host plant in China. Fabaceae: *Trifolium* sp. (Tang and Hao 1995).

Distribution in China. Yunnan (Jingdong) (Borchsenius 1960).

***Lecanodiaspis costata* (Borchsenius, 1959)**

Psoraleococcus costatus Borchsenius, 1959: 842. Type data: China: Yunnan Province, 25 km south of Szemao [= Simao], in forest, on the stems of an undetermined plant. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis costata (Borchsenius, 1959): Lambdin et al. 1973: 6.

Psoraleococcus costatus Borchsenius, 1959: Kozár and Drozdják 1998: 419.

Host plant in China. Fagaceae: *Castanea mollissima* (Lambdin et al. 1973).

Distribution in China. Yunnan (Simao) (Borchsenius 1959).

***Lecanodiaspis cremastogastris* Takahashi, 1929**

Lecanodiaspis [sic!] *cremastogastris* Takahashi, 1929: 47. Type data: China: Taiwan Province, Hori [= Howli], attacking branches of *Lithocarpus*. Syntypes, female, Type depository: Sapporo: Entomological Institute, Faculty of Agriculture, Hokkaido University, Japan.

Lecanodiaspis cremastogastris Takahashi, 1929: Howell and Kosztarab 1972: 122.

Host plants in China. Fagaceae: *Lithocarpus* sp. (Takahashi 1929), *Quercus* sp. (Takahashi 1942).

Distribution in China. Hainan (Dwa Bi) (Takahashi 1942), Taiwan (Howli) (Howell 1971).

***Lecanodiaspis elongata* Ferris, 1950**

Lecanodiaspis [sic!] *elongata* Ferris, 1950: 6. Type data: China: Yunnan Province, near Kunming, An-lin-wen-chian [= Anning], on *Lithocarpus spicata*. Syn-types, female, Type depository: Davis: The Bohart Museum of Entomology, University of California, California, USA.

Lecanodiaspis elongata Ferris, 1950: Howell and Kosztarab 1972: 127.

Material examined. • 4 ♀♀, CHINA: Yunnan Province, Chuxiong Yi Autonomous Prefecture, Zixishan Forest Park, Baotouwang (25°2'33"N, 101°26'21"E), on the back of *Quercus longispica* (Fagaceae) leaves, 14.vii.2021, coll. Hongfei Zhang, Zeren Tan.

Host plants in China. Fagaceae: *Lithocarpus elegans* (= *L. spicatus*) (Ferris 1950), *Quercus longispica*.

Distribution in China. Yunnan (Chuxiong, Kunming (Ferris 1950)).

***Lecanodiaspis foochowensis* Takahashi, 1936**

Lecanodiaspis [sic!] *cremastogastri foochowensis* Takahashi, 1936: 217. Type data: China: Fujian Province, Foochow [= Fuzhou], on an unknown host. Lectotype, female, by subsequent designation. Type depository: Sapporo: Entomological Institute, Faculty of Agriculture, Hokkaido University, Japan.

Lecanodiaspis foochowensis Takahashi, 1936: Howell and Kosztarab 1972: 127.

Psoraleococcus foochowensis (Takahashi, 1936): Kozár and Drozdják 1998: 420.

Host plant in China. Unidentified host (Lambdin et al. 1973).

Distribution in China. Fujian (Fuzhou) (Takahashi 1936).

***Lecanodiaspis jiangxiensis* Zhang & Wang, sp. nov.**

Material examined. • 16 ♀♀, CHINA: Jiangxi Province, Yichun City, Fengxin County, Zaoxia Town, Niyang Village (28°49'16"N, 115°5'40"E), on branches of *Castanea mollissima* (Fagaceae), 13.vii.2022, coll. Jiangtao Zhang. Holotype, female. Type depository: Jiangxi: College of Forestry, Jiangxi Agricultural University, China.

Host plant in China. Fagaceae: *Castanea mollissima*.

Distribution in China. Jiangxi (Yichun).

***Lecanodiaspis lithocarpi* Sun & Shi, 1991**

Lecanodiaspis lithocarpi Sun & Shi, 1991: 185–188. Type data: China: Yunnan Province, Simao, on *Lithocarpus corneus*. Holotype, female, Type depository: Shandong: Insect Collections of the Department of Plant Protection, Shandong Agricultural University, China.

Host plant in China. Fagaceae: *Lithocarpus corneus* (Sun and Shi 1991).

Distribution in China. Yunnan (Simao) (Sun and Shi 1991).

***Lecanodiaspis pasaniae* (Borchsenius, 1960)**

Prosopophora pasaniae Borchsenius, 1960: 224. Type data: China: Yunnan Province, on branches of *Pasania dealbata*. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis pasaniae (Borchsenius, 1960): Howell et al. 1973: 46.

Prosopophora pasaniae Borchsenius, 1960: Kozár and Drozdják 1998: 418.

Host plant in China. Fagaceae: *Lithocarpus dealbatus* (Borchsenius 1960).

Distribution in China. Yunnan (Kunming) (Borchsenius 1960).

***Lecanodiaspis peni* (Borchsenius, 1960)**

Prosopophora peni Borchsenius, 1960: 229. Type data: China: Sichuan Province, on branches of unknown tree. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis peni (Borchsenius, 1960): Lambdin et al. 1973: 20.

Prosopophora peni Borchsenius, 1960: Kozár and Drozdják 1998: 419.

Host plant in China. Unidentified host (Borchsenius 1960).

Distribution in China. Sichuan (Chengdu) (Borchsenius 1960).

***Lecanodiaspis quercus* Cockerell, 1896**

Lecanodiaspis [sic!] (*Prosopophora*) *quercus* Cockerell, 1896: 51. Type data: Japan: Tokyo, on *Quercus*. Syntypes, female, Type depository: Washington: United States National Entomological Collection, U.S. National Museum of Natural History, District of Columbia, USA.

Prosopophora quercus (Cockerell, 1896): Maskell 1897: 243.

Psoraleococcus quercus (Cockerell, 1896): Borchsenius 1960: 241.

Lecanodiaspis quercus Cockerell, 1896: Howell and Kosztarab 1972: 127.

Lecanodiaspis majesticus Wang & Qiu, 1986: 303. Type data: China: Shandong Province, on *Pasania cleistocarpa*. Synonymized by Tang and Hao 1995: 268.

Material examined. • ♀, CHINA: Yunnan Province, Zhaotong City, Daguan County, Tianxing Town, Nanmakan (27°50'17"N, 103°58'12"E), on the branch of *Quercus acutissima* (Fagaceae), 20.iv.2021, coll. Xubo Wang.

Host plants in China. Fagaceae: *Lithocarpus cleistocarpus* (= *Pasania cleistocarpa*) (Wang and Qiu 1986), *Quercus acutissima*.

Distribution in China. Shandong (Wang and Qiu 1986), Yunnan (Zhaotong).

***Lecanodiaspis robiniae* (Borchsenius, 1960)**

Prosopophora robiniae Borchsenius, 1960: 230. Type data: China: Yunnan Province, vicinity of Kunming, on branches of *Robinia pseudoacacia*. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis robiniae (Borchsenius, 1960): Howell and Kosztarab 1972: 2.

Prosopophora robiniae (Borchsenius, 1960): Kozár and Drozdják 1998: 419.

Host plant in China. Fabaceae: *Robinia pseudoacacia* (Borchsenius 1960).

Distribution in China. Yunnan (Kunming) (Borchsenius 1960).

***Lecanodiaspis simaoensis* Sun & Shi, 1991**

Lecanodiaspis simaoensis Sun & Shi, 1991: 341–342. Type data: China: Yunnan Province, Simao, on *Quercus*. Holotype, female, Type depository: Shandong: Insect Collections of the Department of Plant Protection, Shandong Agricultural University, China.

Host plant in China. Fagaceae: *Quercus* sp. (Shi et al. 1991).

Distribution in China. Yunnan (Simao) (Shi et al. 1991).

***Lecanodiaspis tingtunensis* (Borchsenius, 1960)**

Prosopophora tingtunensis Borchsenius, 1960: 231. Type data: China: Yunnan Province, vicinity of Tsindun [= Jingdong], on branches of *Pasania*. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Lecanodiaspis tingtunensis (Borchsenius, 1960): Lambdin et al. 1973: 24.

Prosopophora tingtunensis Borchsenius, 1960: Kozár and Drozdják 1998: 419.

Material examined. • 14 ♀♀, CHINA: Yunnan Province, Puer City, Ninger Hani and Yi Autonomous County, near People's Hospital (23°3'39"N, 101°2'26"E), on the branches of *Elaeocarpus decipiens* (Elaeocarpaceae), 17.x.2018, coll. Xubo Wang.

Host plants in China. Elaeocarpaceae: *Elaeocarpus decipiens*; Fagaceae: *Lithocarpus* sp. (= *Pasania* sp.) (Borchsenius 1960).

Distribution in China. Yunnan (Jingdong (Borchsenius 1960), Puer).

Genus *Psoraleococcus* Borchsenius, 1959

Psoraleococcus Borchsenius, 1959: 841. Type species: *Psoraleococcus verrucosus* Borchsenius, 1959.

Psoraleococcus lombokanus Lambdin & Kosztarab, 1973

Psoraleococcus lombokanus Lambdin & Kosztarab, 1973: 63. Type data: Indonesia: Lombok, at Rampoeng (45 km east of Mataram), on *Annona muricata*. Holotype, female, Type depository: Washington: United States National Entomological Collection, U.S. National Museum of Natural History, District of Columbia, USA.

Host plants in China. Fagaceae: *Quercus* sp. (Tang and Hao 1995); Myrtaceae: *Eucalyptus* sp. (Tang and Hao 1995).

Distribution in China. Fujian (Fuzhou) (Tang and Hao 1995), Sichuan (Mount Emei) (Tang and Hao 1995).

Psoraleococcus multipori (Morrison, 1921)

Anomalococcus multipori Morrison, 1921: 641. Type data: Singapore: on *Nephelium lappaceum*. Holotype, unknown, Type depository: Washington: United States National Entomological Collection, U.S. National Museum of Natural History, District of Columbia, USA.

Psoraleococcus multipori (Morrison, 1921): Lambdin and Kosztarab 1973: 73.

Material examined. • 9 ♀♀, CHINA: Hainan Province, Wuzhishan City, Tongshen Town (18°44'12"N, 109°32'32"E), on the branches of *Dimocarpus longan* (Sapindaceae), 20.ii.2022, coll. Chaoqun Li, Huihui Zhong, Jiangtao Zhang.

Host plant in China. Sapindaceae: *Dimocarpus longan*.

Distribution in China. Hainan (Wuzhishan).

Psoraleococcus verrucosus Borchsenius, 1959

Psoraleococcus verrucosus Borchsenius, 1959: 842. Type data: China: Yunnan Province, 8 km north of Szemao [= Simao], in forest, on stems of an undetermined stems. Holotype, female, Type depository: St. Petersburg: Zoological Museum, Academy of Science, Russia.

Material examined. • 5 ♀♀, CHINA: Yunnan Province, Dai Autonomous Prefecture of Xishuangbanna, Mengla County, Menglun Town, Xishuangbanna Tropical Botanical Garden (21°55'41"N, 101°15'26"E), on the branches of *Calamus* sp. (Arecaceae), 20.iv.2018, coll. Xubo Wang; • 2 ♀♀, CHINA: Hainan Province, Ledong Li Autonomous County, Jianfengling Rainforest Valley (18°44'45"N, 108°55'57"E), on the branches of *Ilex chinensis* (Aquifoliaceae), 15.iii.2021, coll. Yong Wang.

Host plants in China. Aquifoliaceae: *Ilex chinensis*; Arecaceae: *Calamus* sp.; Phyllanthaceae: *Glochidion* sp. (Lambdin and Kosztarab 1973).

Distribution in China. Hainan (Ledong), Taiwan (Kuraru [= Guizaijiao], Taihoku [= Taipei]) (Lambdin and Kosztarab 1973), Yunnan (Simao (Borchsenius 1959), Xishuangbanna).

Discussion

Wang (1982) established the genus *Crescoccus* with *C. candidus* Wang, 1982 as the type species, and placed it within the family Lecanodiaspididae. *Crescoccus* is distinguished from other genera of Lecanodiaspididae by the following characters: (i) absence of stigmatic spines; (ii) anal ring with six setae; (iii) a distinctive type of cribriform plates; (iv) absence of multilocular disc pores; (v) numerous quinquelocular pores over the entire dorsum (Wang 1982). However, Tang and Hao (1995) suggested that *C. candidus* is actually the nymph of *Pseudopulvinaria sikkimensis* Atkinson, 1889 (family Coccidae), and treated it as a synonym of the latter. Since no original specimens of *C. candidus* are available for examination, the genus *Crescoccus* and the species *C. candidus* were excluded from this study.

Douglas (1892) proposed the genus *Prosopophora* with *P. dendrobii* Douglas, 1892 as the type species. Later, Cockerell (1896) synonymized it under *Lecanodiaspis*. In 1960, Borchsenius (1960) re-established the genus and added several new species. Subsequently, Howell and Kosztarab (1972) made a thorough revision of *Lecanodiaspis* and once again synonymized *Prosopophora* with *Lecanodiaspis*. However, Kozár and Drozdják (1998) continued to treat *Prosopophora* as a valid genus, but apparently without having studied the original specimens and therefore without a reliable basis for its separation from *Lecanodiaspis*. Since Howell and Kosztarab's (1972) revision was mainly based on original specimens, their work, at least for now, provides the most reliable distinctions between related species and genera. In this study, we follow the conclusions of Howell and Kosztarab (1972), while acknowledging that future methods, such as molecular data, may provide more clarity. For the benefit of future researchers, we have added the citation of Kozár and Drozdják (1998) in the species nomenclatural histories, although their suggestions were not adopted in this study.

Wang and Qiu (1986) reported a *Lecanodiaspis* species, *L. majestica* Wang & Qiu, 1986, collected on *Lithocarpus cleistocarpus* (= *Pasania cleistocarpa*) (Fagaceae) from Shandong, China. The species is similar to *L. quercus* Cockerell, 1896, but can be distinguished by the following characters: (i) terminal antennal segment with four spine-like setae, with the largest seta sometimes forked; (ii) cribriform plates arranged in four longitudinal rows, evenly scattered on the meta- and mesothorax; (iii) absence of legs (Wang and Qiu 1986). However, Tang and Hao (1995) found that none of the above characters were beyond the range of variation described by Howell and Kosztarab (1972) with specimens of *L. quercus* mainly from Japan, so they treated it as a junior synonym of the latter. Here, we follow the opinion of Tang and Hao (1995).

Lecanodiaspis costata (Borchsenius, 1959) was originally reported from Simao, China on an undetermined plant by Borchsenius (1959) under the name *Psoraleococcus costatus*. Later, Tang and Hao (1995) recorded this species from Mengyang, feeding on *Quercus acutissima* and *Q. variabilis* (Fagaceae).

However, since they did not provide details of the specimens examined, the distribution and host plants they provided are not included in our checklist.

Psoraleococcus multipori (Morrison, 1921) was first reported by Morrison (1921) from Singapore on *Nephelium lappaceum* (Sapindaceae) under the name *Anomalococcus multipori*. The species was later recorded from Indonesia (Green 1930) and Philippines (Lit 1997). Takahashi (1928) had previously recorded this species from the nest of *Cremastogaster rogenhoferi* (family Formicidae) in Taiwan, but this was later found to be an undescribed species (Takahashi 1929). More recently, Miller et al. (2014) examined specimens taken at United States quarantine inspection, including some from Taiwan. However, the origin of these specimens remains uncertain (D.R. Miller and S.A. Schneider pers. comm.). Therefore, the specimens collected in Hainan during the present study represent the first confirmed record of this species in China.

Acknowledgements

The authors are very grateful to Dr Ilya A. Gavrillov-Zimin (Zoological Institute, Academy of Sciences, St. Petersburg, Russia) for kindly checking the original specimens of *Prosopophora pasaniae* Borchsenius, 1960 (= *Lecanodiaspis pasaniae*) and comparing it with the new species. We would also like to thank Drs D.R. Miller and S.A. Schneider (USDA, Agricultural Research Service, Henry A. Wallace Beltsville Agricultural Research Center, Systematic Entomology Laboratory, Maryland, USA) for their assistance in confirming whether *Psoraleococcus multipori* was previously distributed in Taiwan, China or not. Ms B.D. Denno (Florida State Collection of Arthropods, Department of Plant Industry, Florida, USA) kindly provided clarification of nomenclatorial information given in the ScaleNet catalog entries.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

Funding

This study was supported by the National Natural Science Foundation of China (No. 32000328), Jiangxi Provincial Key Laboratory of Conservation Biology (No. 2023SSY02081), Open Foundation (ZKJS-T-202201) of the Key Laboratory of Forest Disaster Warning and Control in the Universities of Yunnan Province (College of Biodiversity Conservation, SWFU), and the Yunnan Agricultural Joint Foundation Project (202301BD070001-036).

Author contributions

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Data availability

All of the data that support the findings of this study are available in the main text.

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